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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,223	07/26/2006	Hans-Peter Brack	5026-1001	3418

466 7590 11/29/2011  
YOUNG & THOMPSON  
209 Madison Street  
Suite 500  
Alexandria, VA 22314

EXAMINER
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WOOD, JARED M

ART UNIT	PAPER NUMBER
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1731

NOTIFICATION DATE	DELIVERY MODE
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11/29/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,223	<b>Applicant(s)</b> BRACK ET AL.	
	<b>Examiner</b> JARED WOOD	<b>Art Unit</b> 1731	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 5) ☒ Claim(s) 21-28,31-35 and 37-39 is/are pending in the application.
- 5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 21-28,31-35 and 37-39 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

Art Unit: 1731

### **DETAILED ACTION**

The examiner acknowledges receipt of the response filed 09/23/2011. Claims 1-20, 29-31, and 36 are cancelled. Claims 21-28, 32-35, and 37-39 are currently pending for examination.

#### ***Claim Objections***

In view of applicant's amendment to claim 24, the previously issued objection has been withdrawn.

#### ***Claim Rejections - 35 USC § 112***

In view of the amendments filed 09/23/2011, the previously issued rejections under 35 U.S.C. 112 have been withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 21-28, 31-34, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.)**

**As to claims 21, 26, 37, and 39,** Huslage discloses a method for producing a membrane electrode assembly (MEA) comprising providing an FEP film (ion conducting copolymer of polytetrafluoroethylene and polyhexafluoropropylene) exposing the film to electron-beam

Art Unit: 1731

irradiation, exposing the film to a solution comprising styrene (ionomer) and divinylbenzene (DVB) (crosslinker) in EtOH or isopropanol/water (solvent), sulphonating the membrane with chlorosulphonic acid, washing the sulphonated membrane, swelling the membrane in DI water for 5 hours at 80 °C, surface coating the grafted membrane with Nafion by immersion in a Nafion solution. The swelled, coated membrane is then dried at room temperature and then at 130 °C. The dried membrane is then re-swelled by boiling in deionized water. The re-swelled membrane is then combined with ELAT-electrodes and is then hot-pressed at 40-50 bar (4-5 MPa) and 115 °C for 3 minutes (180 seconds) to form the MEA (pg. 248-249, section 2).

Huslage does not expressly disclose swelling for a time of 4-5 hours at this stage.

However, it would have been obvious to one of ordinary skill in the art at the time of invention to optimize the time and water temperature of Huslage's swelling steps according to the artisan's specific needs (i.e. saving time or saving money). In other words reducing the temperature of the water would result in a longer period of time being needed to affect the same level of water take-up by the membrane. Or alternatively, to reduce the swelling time, the temperature of the water could be raised. This is further evidenced by Huslage's previously used swelling step where the membrane was soaked in DI water at a temperature of 80 °C for a period of 5 hours. See MPEP 2144.05, II, A.

**As to claims 22, 23, and 28**, although Huslage does not expressly disclose that the catalytic layer is disposed between the electrode layers and the ion conducting membrane or the specific materials used to form the electrode layers, Huslage does disclose the use of ELAT-electrodes which are a carbon cloth material which has a layer of catalyst deposited on a single

Art Unit: 1731

side of the cloth and wherein the catalyst side of the cloth is located adjacent to the membrane during MEA assembly.

**As to claims 24 and 33**, Huslage discloses hot-pressing at 40-50 bar (4-5 MPa) and 115 °C for 3 minutes (180 seconds) to form the MEA (pg. 248-249, section 2).

**As to claim 25**, Huslage discloses that the catalyst material on the electrode layers is Pt (pg. 248-249, section 2).

**As to claims 27 and 34**, Huslage's FEP film has an initial thickness of 25  $\mu\text{m}$  and a swelled thickness of 34  $\mu\text{m}$  (pg. 248-249, section 2).

**As to claim 32**, EtOH and isopropanol are both polar protic (exhibit hydrogen bonding) solvents. As provided above, the Huslage's membrane is exposed to EtOH or isopropanol.

**As to claim 38**, Huslage discloses that the membrane is in a swollen state (wet) at the start of hot-pressing (pg. 248-249, section 2).

**Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Radiation-grafted membrane/electrode assemblies with improved interface* (Huslage et al.) in view of *Methods to Advance Technology of Proton Exchange Membrane Fuel Cells* (Ticianelli et al.).**

Huslage discloses that his ELAT electrodes have been impregnated with solubilized Nafion (page 249, ¶ 2). While Huslage does not detail the specific process in which this impregnation is carried out, he does cite the disclosure of Ticianelli in conjunction with this impregnation (section 3, ¶ 1).

Art Unit: 1731

Ticianelli discloses a method of Nafion impregnation of carbon gas diffusion electrodes comprising treating the electrode layer with a solution of Nafion in isopropanol/water (Experimental section, ¶ 1).

In the event that Huslage's electrodes are not specifically produced in the manner disclosed by Ticianelli, it would have nevertheless been obvious to one of ordinary skill in the art at the time of invention to do so in view of Huslage's direct citation of the disclosure of Ticianelli.

#### ***Response to Arguments***

Applicant's arguments filed 09/23/2011 have been fully considered but they are not persuasive. On page 9, applicant alleges that unexpectedly improved results are achieved by control of the water content of the membrane. However, the evidence provided by the applicant to support such a conclusion is not commensurate with the scope of the claims and is therefore, not persuasive.

#### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 1731

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JARED WOOD whose telephone number is (571)270-5911. The examiner can normally be reached on Monday - Friday, 7:30 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JARED WOOD/  
Examiner, Art Unit 1731

/J.A. LORENZO/  
Supervisory Patent Examiner, Art Unit  
1731

Application/Control Number: 10/577,223

Page 7

Art Unit: 1731